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Study to test hypothesis that students given experience in examining research reports "creatively" would produce "new ideas" of higher quality than would those examining such reports "critically." One hundred graduate students in an educational psychology course participated in the experiment. Results of the study supported hypothesis.

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"EXPLORATIONS IN CREATIVE THINKING IN MENTAL HYGIENE, III. EFFECTS OF INDUCED EVALUATIVE SETS ON THE DEVELOPMENT OF NEW IDEAS"

By. E. Paul Torrance

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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September 1959

BUREAU OF EDUCATIONAL RESEARCH
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Research Memoranda of the Bureau of Educational Research are informal reports designed to communicate quickly research results of rather general interest to the staff of the College of Education. In some cases, these will be progress reports of studies for which more formal publication may be anticipated. In other cases, they will deal with completed studies primarily of local interest.

Though Research Memoranda are intended primarily for the staff of the College of Education, they will also be used to provide cooperating agencies and/or individuals with pertinent information and to obtain constructive criticism from colleagues in other institutions.

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FOREWORD

This Research Memorandum is the third in a series of reports of exploratory studies concerning the development of creative thinking in college teaching. The first in this series dealt with the effects of small group activities as an adjunct to lecture-discussion sessions and as a substitute for efforts to do individual creative thinking. The second dealt with the personality characteristics of the more creative members of a graduate course in educational psychology (Personality Development and Mental Hygiene).

The study reported herein was also conducted as an adjunct to similar studies being conducted at the elementary school level. The larger project is concerned with the role of evaluation in creative thinking. The major objective of the project is to develop and test principles for (a) developing an environment which places a high value on creativity; (b) guiding the evaluative behavior of teachers, counselors, and administrators; and (c) helping individuals develop evaluative behavior conducive to creative thinking. The present study is designed to contribute to the last of these objectives.

The author is indebted to Mr. Thomas W. Jeglosky for his assistance in collecting the data and evaluating the creativity projects and to Mr. P.R. Krishnaiah for his analysis of the data.

E. Paul Torrance

E. Paul Torrance, Director
Bureau of Educational Research

SUMMARY OF REPORT

It was hypothesized that students given experiences in examining research reports creatively would themselves produce "new ideas" of higher quality than those having experiences in examining such reports critically. One hundred graduate students in Educational Psychology 159 (Personality Development and Mental Hygiene) were assigned randomly to Conditions XA and XB, critical and creative sets respectively. The reports on the research reports were completed by the end of the first half of the course and the "new-ideas" projects were completed during the second half of the course. The "new-ideas" projects were evaluated on five criteria of inventivlevel and five criteria of completeness and adequacy of presentation.

No statistically significant differences were found between the means of subjects in Conditions XA and XB on a pre-test of "Creative Thinking in Mental Hygiene," the insignificant difference being in favor of Condition XA. On the "new-idea" projects a mean of 74.66 was obtained for subjects in Condition XA and one of 80.33, for those in Condition XB. This difference is significant at between the .01 and .02 level ($t = 2.57$). Thus, the original hypothesis is supported by the results and it appears that experience in reading and analyzing research reports creatively is an aid in developing "new ideas" of one's own.

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EXPLORATIONS IN CREATIVE THINKING IN MENTAL HYGIENE

III. EFFECTS OF INDUCED EVALUATIVE SETS ON THE DEVELOPMENT OF NEW IDEAS

INTRODUCTION

Considerable attention has been devoted in higher education to the development of critical thinking. In developing a scientific orientation among graduate students we characteristically require them to examine research reports in professional journals with a critical attitude. In their own research, however, these students are expected to be "original" or "creative."

Sensitivity to deficiencies is generally accepted by students of creativity as an important aspect of creative work, especially in the sciences. Guilford and others (1951), for example, include sensitivity to deficiencies as a factor in creative thinking. Rossman (1931), in studying the psychology of inventors, concluded that the non-inventor tends to "cuss" the deficiencies of his environment, whereas the inventor engages in constructive criticism of the "this-is-the-way-to-do-it" variety. Pepinsky and Pepinsky (1958) have hypothesized that creative individuals express their criticism in a constructive and depersonalized way. Many students in the field (Clark, 1958; Rossman, 1931; Russell, 1956) have stressed the importance of an individual's placing value on his own ideas and on his own perceptions and experiences as means of learning.

The study reported herein attempts to evaluate experimentally the effects of having graduate students examine research reports critically compared with having them to study such reports creatively. It was hypothesized that students given experiences in examining research reports creatively would themselves produce a higher quality of "new ideas" than those having experiences in examining such reports critically.

PROCEDURES

Subjects of the study were 100 students enrolled in Educational Psychology 159 (Personality Development and Mental Hygiene) at the University of Minnesota during the first summer session, 1959. At least one item of data is missing for two of the subjects, however. Thus only 98 subjects are included in the study.

Experimental Instructions

Subjects were assigned randomly to Conditions XA (Critical Set) and XB (Creative Set) in meeting one of the requirements of the course (the reading and analysis of research reports). The instructions for Condition XA were as follows:

"In meeting this requirement, you will select and read critically two recent (since 1950) research articles related to personality development and mental hygiene prior to July 3. You may read them from whatever journals you like. Some of the more appropriate ones are listed below:

American Journal of Orthopsychiatry
Personnel and Guidance Journal
Genetic Psychology Monographs
Journal of Genetic Psychology
Elementary School Journal
Journal of Counseling Psychology
Group Psychotherapy
Psychiatry
Sociometry
Human Relations
Journal of Social Psychology
Journal of Abnormal and Social Psychology
Mental Hygiene
Journal of Personality
Journal of Consulting Psychology

"Your report on each article should include the following:

1. A brief statement of the gist of the article -- not a comprehensive summary, just a brief statement of what was done and the major conclusions.

2. A description of the defects in the statement of the problem, its importance, the underlying assumptions, its newness, and the like.

3. A description of the defects in the underlying assumptions of the hypotheses studied, their agreement with known facts, and the like.

4. A description of defects in the procedures for collecting and analyzing the data, selection of sample, size of sample, methods and instruments of data collection, techniques of analysis, reporting of data, and the like.

5. A description of defects in conclusions, interpretation of findings, implications of the findings, appropriateness to actual situations, and the like.

6. A critical appraisal of the general worth of the article to knowledge concerning personality development and mental hygiene."

The instructions given under Condition XB were identical except that subjects were instructed to read the two research articles imaginatively rather than critically, with the following instructions for preparing their reports:

"Your report on each article snould include the following:

1. A brief statement of the gist of the article -- not a comprehensive summary, just a brief statement of what was done and the major conclusions.

2. A brief statement of new possibilities suggested by the statement of the problem, possible consequences stemming from its solution, other assumptions and theoretical rationales which might have been brought to bear on the problem, and the like.

3. A listing of other possible hypotheses related to the problem, known facts which might have been used in sharpening or modifying hypotheses, and the like.

4. A description of improvements which might have been made in the procedures for collecting and analyzing the data, selection of samples, methods and instruments of data collection, techniques of analysis, reporting of data, and the like.

5. A description of other possible conclusions, interpretations of the findings, implications of the findings, analogy to situations with which you are familiar, and the like.

6. An appraisal of the possibilities stemming from the findings and the extent to which the research reported represents a step forward in knowledge in personality development and mental hygiene."

Reports were evaluated and the results used in determining final grades (approximately 5 per cent of the total points possible).

The "New-Idea" Project

As a part of the course requirements, each subject was expected to develop an original idea, theory, or hypothesis concerning personality development or mental hygiene. Instructions given in the course syllabus for this project are as follows:

"First, think of as many new ideas as you can about some aspect of personality development and mental hygiene which particularly interests you. If possible, you should select some problem about which you can become fully absorbed. Jot down ideas as they occur to you. After two or three

weeks, select the idea which appeals to you most and develop it more completely. Your report should describe how the idea occurred to you, why you think it is true or "would work," how it might be tested further, and what consequences it might have."

The deadline for submitting this project was the last session of the course, whereas the deadline for the reading reports was at the time of the mid-term evaluation.

Each project was evaluated on a ten-point scale for each of ten criteria. Five of these were adapted from the criteria of "inventivlevel" as defined in U.S. patent law (McPherson, 1956). The other five were related to the completeness and adequacy of the presentation of the idea. The five criteria adapted from U.S. patent law are:

1. Qualified intellectual activity or creative strength used in solving the problem.
2. Usefulness of the idea, if executed or found tenable.
3. Step forward or advance over present knowledge and/or practice.
4. Originality or newness in overcoming a special difficulty.
5. Surprisingness, remarkableness, etc.

The following points were judged in regard to completeness and adequacy of the presentation of the idea:

1. Statement of the idea.
2. Description of the development of the idea.
3. Statement of its rationale.
4. Statement of possible procedure(s) for testing the idea.
5. Prediction of possible consequences of idea.

Satisfactory inter-scorer reliability was obtained between the two judges. Only in three or four cases was it necessary to arbitrate differences between the two scorers. At the time the scoring was accomplished, the judges had no knowledge of the experimental condition to which subjects had been assigned.

Analysis of Data

Although subjects were assigned to Conditions XA and XB randomly, a further check on the equivalency of the two groups was made by comparing their mean scores on the pre-test of "Creative Thinking in Mental Hygiene" developed by the author for use in this course. A mean of 56.4 was obtained for the 53 subjects in Condition XA and 54.6 for the 45 subjects in Condition XB. The difference is not statistically significant. Thus, we may assume

that the two groups were initially equivalent in their ability to do creative thinking in the field of mental hygiene. In fact, the insignificant difference which exists is in favor of Condition XA.

Means on the creativity projects were computed and compared by means of the t test.

RESULTS

A mean of 74.66 was obtained for the 53 subjects in Condition XA on the creativity project compared with a mean of 80.33 for the 45 subjects in Condition XB. A t ratio of 2.57, significant at between the .01 and .02 level, was obtained. The results thus support the hypothesis that subjects given experience in examining research reports creatively will themselves produce "new ideas" of higher quality than will those having experiences in examining such reports critically.

DISCUSSION

The need for replicating this experiment in other courses and under a variety of conditions are of course obvious. The results reported herein, however, do indicate that giving students experience in reading and analyzing creatively research reports in professional journals may be useful in aiding students to develop "new ideas" of their own. Apparently the rejecting or negative set induced by reading and analyzing research reports tends to inhibit students in their efforts to think of "new ideas." The results obtained in the present study are all the more remarkable because some of the subjects resisted the assumption of the assigned set and some of the reports gave no evidence of either creative or critical thinking.

Plans have already been formulated for testing the principle under study here in a number of situations at the elementary-school level.

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